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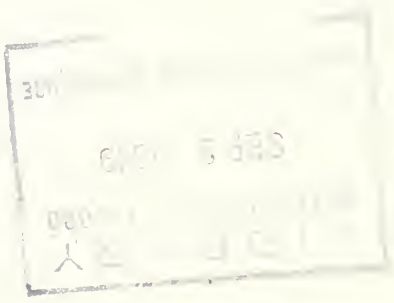

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MANAGEMENT METHODS AND SAFEGUARDS EMPLOYED IN REDUCTIONAL CONTROL OF INJURIOUS WILDLIFE 1/

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CONTENTS

	Page		Page
Introduction	2	Foreword	5
Management methods	3	Traps	6
Elimination of rodent habitat	3	Handling poison baits	6
Timely planting	3	Demonstration and supervision	6
Regulated grazing	4	Careful planning to limit poison use	6
Defensive methods	4	Limiting operational period	7
Scarecrows	4	Protection through selective baits	7
Repellents	4	Proper timing of poison use	7
Fences	5	Protected bait replacement	8
Transplanting wildlife to less vulnerable areas	5	Discussion	8
Aggressive methods	5		

1/ This leaflet supersedes Wildlife Leaflet BS-115 issued in June 1938 by the Bureau of Biological Survey of the Department of Agriculture under the title "Cultural and other Methods for the Control of Injurious Wildlife."

INTRODUCTION

Control of mammals and birds that cause economic losses is one of the most perplexing problems in the wildlife field. This is because of the widespread opinion that an impassable rift exists between the interests of the farmer, stockman, poultryman, and forester, who seek protection for their products, and those who deplore sweeping reductions of any form of wildlife. The Fish and Wildlife Service, with a staff engaged in control-methods research, is in position to be of service to all interests in clearing this unnecessary misunderstanding.

Unquestionably, some form of control is often necessary. This is admitted even by the man most out of contact with wildlife. For example, one who lives in an apartment hotel in any of the large eastern cities has on occasion halted, daubed hurriedly at the shoulder of his coat, and uttered a few angrily appropriate words as to the flocks of starlings on the electric signs overhead; and the next day he may have directed similar remarks to the mole whose runway deflected the golf ball from his well-directed putt.

In the last analysis, however, all are of one mind regarding the desirability of conservation of wildlife resources. The farmer, once his means of livelihood is not endangered by losses chargeable to wildlife, becomes the mainstay of the wildlife conservation program. In fact, wildlife is the heritage of the landholders. Until research develops adequate means of preventing damage by certain animals, however, the farmer and rancher must continue to control them by population reduction. Support of plans for large game increases can hardly be expected until management of game is so perfected that agricultural crops will not be endangered.

It is essential that adequate crop protection from damage by mammals and birds be attained in many instances without harm to the offending species. Control-methods research is management research in the best sense of the term. The Fish and Wildlife Service, through development of new methods of suppressing injurious birds and mammals, and by careful supervision of methods already in use, endeavors to afford protection to game and other desirable forms of wildlife, and to field crops, domestic livestock, and to the public health, while at the same time minimizing the injury to beneficial or harmless species. Such research is an important part of conservation.

It will be well to consider briefly how methods can be developed and applied for protecting wildlife, forests, and agricultural products from destructive mammals and birds, and at the same time follow the precepts of wildlife conservation. Some of the methods herein mentioned may seem commonplace, but few people realize how extensively they are used.

MANAGEMENT METHODS

Management methods consist in modifying agricultural practices, including those concerned with livestock raising, so as to prevent or modify conditions that encourage damage caused by wildlife. Development of cultural methods requires a far-reaching program, and one that in its many ramifications is necessarily time-consuming in its application.

Elimination of Rodent Habitat

In orchard regions--on the Pacific coast, in western Colorado, in Virginia, or in New England--losses are caused through the girdling of apple and other fruit trees by the common meadow mouse. The annual loss reaches six figures. Except under plague conditions, the number of meadow mice that infest an orchard depends upon the available cover and food. Where clean cultivation is practiced, these rodents will not be troublesome. If, however, in the interest of soil conservation and moisture control it is necessary to maintain a sod mulch in the orchard, then the grass should be mowed short, and a space having a 2-foot radius around the base of each tree should be kept clean. The orchard floor should be smooth; that is, free of ruts, terraces, and rock outcrops, for it is in such shelters that meadow mice gain their first foothold. The fruit-grower who eliminates the habitat will have less need to apply other control methods.

In a similar fashion, weedy fence rows, ditch banks, and brushy areas encourage the presence of cottontail rabbits, woodchucks, cotton rats; crowned and unworked fence rows favor the presence of moles; and brush-grown ponds in rice areas encourage the presence of blackbirds. Whenever such wildlife becomes destructive, the elimination or reduction of favorable habitat, near growing crops will effect more lasting good than annual use of poisons, traps, or other measures of reductional control.

Timely Planting

Resident and migrating flocks of blackbirds each fall cause heavy damage to ripening rice in Arkansas, Louisiana, Texas, and California. Early maturing varieties are less affected since they are harvested before the large droves of blackbirds have gathered. Early planting may also lead to losses because the large wintering flocks have not yet scattered to their breeding grounds. The increasing use of combines and kiln driers is an advancement that will materially lessen losses from birds feeding on the ripened grain.

Regulated Grazing

Studies of the Fish and Wildlife Service have revealed that pocket gophers do not reach peak infestations in climax grasslands. Overgrazing cattle and sheep, however, results in replacement of the forage grasses by the less palatable bulbous-rooted plants (weeds), and as these are a favored food of the pocket gopher, the numbers of these rodents tend to increase. An over-abundance of gophers causes the eradication of the plants, which in turn is followed by erosion and lowering of water tables. The solution is clearly indicated--controlled or managed grazing to maintain climax grasslands.

DEFENSIVE METHODS

Scarecrows

In this mechanical age the best scarecrows are noise and light makers, such as flash guns, revolving lights, and fireworks. These and similar contrivances are designed to keep flights of ducks from alighting in a grain field, to drive herons from a locality in which their roosts prove objectionable, or to protect crops from various other birds.

Repellents

Chemicals having a repellent taste or odor, or forming a coating that is hard, gritty, or tacky, are widely applicable, and their development therefore is a promising field of research. For example, the uncanny ability of chipmunks, deer mice, kangaroo rats, and other small rodents to locate and dig up planted seed curtails the use of this method in reforestation and range re-seeding, unless a rodent reduction program is carried on simultaneously. An effective repellent coating would make direct seeding possible. Certain sprays are now available, but more research is needed to develop materials that will fend off deer, rabbits, and porcupines from feeding on seedling conifers, nursery stock, and orchards. Studies are under way to devise repellents for many types of manufactured items that are damaged by wildlife, as illustrated by the need for a repellent-incorporated wire covering for telephone and communications cable to check the gnawing by squirrels, gophers, and other rodents that disrupt the service.

Recently, application has been made of the simple physiological fact that birds not only perceive but react to color. It has been demonstrated that exposed seeds and other foods that are unnaturally colored are avoided by birds but readily accepted by rodents which are generally considered to be color-blind. Thus, by dyeing poisoned grain used in field rodent control, losses of beneficial birdlife may be materially reduced. Bird feeding on growing crops might also be lessened by this "color repellent."

Fences

In parts of southwestern Texas, sheep are grazed without herders in areas surrounded by coyote-proof fences. Many gardens also are enclosed. Electric fences have been used effectively to exclude raccoons, skunks, and porcupines from cornfields and gardens. The wire-net guard wrapped about the base of fruit trees to prevent girdling by rabbits and mice is modified by fencing. Metal shields placed about the trunks of nut-bearing trees exclude squirrels. A thin concrete wall sunk 1-½ feet in the ground is a barrier to moles that burrow near valuable bulb plantings. Examples of this method are numerous.

Transplanting Wildlife to Less Vulnerable Areas

The transplanting method of relieving damage has been used perhaps most frequently with beavers. These animals may feed on apple trees; or by damming streams they flood orchards, wood lots, pasture lands, and even roads. Beavers are so valuable in other respects that in place of destroying them it is more desirable to transfer the offenders to non-agricultural areas. Their services in erosion control and their value in producing high-grade fur more than repay the cost of live-trapping and transplanting.

AGGRESSIVE METHODS

Foreword

The Fish and Wildlife Service, both in research and practice, recognizes the need for management-control operations. Each new problem in the control of injurious mammals and birds is studied to determine whether the damage inflicted can be avoided by nonreductive control. At times, however, it is necessary to resort to measures for suppressing the abundance of certain species. The Service fully recognizes that in general the control of animals causing economic losses is largely a local problem. No species is uniformly destructive to man throughout its entire range. Control should be local in extent, and extermination of any species should be avoided. For example, porcupines are destructive locally to orchards and to truck farms in Maine, but as these areas are scattered, state-wide control is unnecessary. Control measures usually need be applied only where damage occurs. When wild animals are responsible for the spread of contagious human diseases, however, severe and even drastic measures may be necessary over wide areas. Methods employed in control by reduction in numbers are well known and for the most part need no explanation. These methods are hunting, trapping, and the use of toxic gases and baits. Such reductive control should not be employed indiscriminately and haphazardly as the discussion that follows will show.

Traps

Traps often may be selective because of their differing size and the place where set; others can be made so by various setting techniques. The common steel trap, for example, used in taking large predatory mammals, can be made relatively selective for the coyote by placing a special spring or creating a tension under the pan so that a certain weight is required before the trap will spring, thus avoiding the capture of smaller animals. Furthermore, there are certain traps that by design are highly selective, such as the pocket gopher trap that is constructed to slip into the rodent burrow.

Handling Poison Baits

Demonstration and supervision

Investigations over the years have disclosed that much of the use of poison by the inexperienced farmer and rancher not only falls short of being effective, but subjects beneficial wildlife to unnecessary hazards. Through direct personal contact by the trained personnel of the Fish and Wildlife Service and that of certain states, through demonstration and supervision of correct formulations and usage, the economy, efficiency, and safety of poisons have been markedly improved.

Careful planning to limit poison use

Many farmers keep poison exposed for field rodents throughout the growing season to prevent crop losses. Not only does this system tend to build up a tolerance or avoidance among the resident rodent population, but it increases the hazard to beneficial birds and mammals. Careful selection of more effective rodenticides and a knowledge of time, place, and manner of application can achieve crop protection in a single yearly application during an exposure period of only a week or two.

Where it is possible by community effort over a period of one or two years to eliminate from a crop-growing area some rodent such as the prairie dog, an organized program should supplant individual effort that makes yearly poisoning a necessity. A savings in cost of farm operations and increased safety to beneficial wildlife will result.

In the control of smaller rodents, poisons are often unnecessarily exposed by the inexperienced. For example, the numbers of meadow mice that inflict severe injury to orchards during the winter months fluctuate greatly from year to year. When the orchardist has been instructed to bait only in active trails, instead of a stipulated quantity per tree, he learns that 1 pound of poison will give as effective protection in 1 year as 20 pounds may accomplish in another. Furthermore, trail baiting markedly increases the effectiveness of such control efforts. The ability to recognize and determine the necessity for rodent control is a contribution to wildlife conservation.

Limiting the operational period

With the proper attention paid to bait selection and timing of exposure, most local rodent populations can be brought under control within 24 to 48 hours, thus making it unnecessary for poison to be exposed longer. At least one poison in common use (zinc phosphide), is self-destructive within a very short period after exposure under field conditions, thus terminating its hazard to domestic animals or beneficial wildlife. A similar effect can be obtained by using a destructible bait that becomes non-poisonous after a short period. These two factors are combined in meadow mouse control in the northeastern states, where zinc phosphide is used on apple cube baits.

Protection through selective baits

It is possible to avoid much of the hazard to beneficial wildlife by simply selecting foods readily eaten by the pest to be controlled and only poorly accepted or entirely rejected by beneficial forms.

Baits can be made selective by the proper choice of poison used. Red squill and ANTU kill rats but are relatively harmless to most other species. Strychnine, when the formula is properly balanced, has a low hazard for gallinaceous birds. In a similar fashion several other, but not all, common rodenticides can be made relatively safe for larger animals by carefully controlling the amount used in the bait.

The Denver Wildlife Research Laboratory has perfected a method of adding an emetic to poison baits for rats with the result that emesis occurs when eaten by other than the rodent for which it was intended. This, in a large measure, gives protection against accidental death.

Proper timing of poison use

It is common knowledge that grain baits are more readily accepted by rodents during certain seasons. Better feeding on the baits means higher efficiency in control and less residual grain left uneaten to form a potential hazard to other wildlife. Often these baiting periods can be selected to coincide with a period when seed-eating birds are at a low seasonal level due to migration, as is true of October baiting for meadow mouse control in New England. Blackbirds, song sparrows, and certain other birds are largely insectivorous early in the season when feeding young and later change to a seed diet. Thus, during the latter period there is greater potential hazard to these birds in the exposure of poison grain for rodent control. Late in the growing season, young birds may not have the caution or physical resistance of the adults when poison grain is accessible. The Wildlife Research Laboratory has demonstrated, for example, that young quail are twice as susceptible to the toxic action of one of the new rodenticides now in common use, as are the adults. Rodent control programs planned early in the season will avoid this additional hazard as well as take advantage of the better feeding habits of certain rodents.

Similarly, the placement of poison-studded stations for the control of coyotes as late in the fall as snow conditions will permit, and the destruction of these stations in the spring as soon as the snowbound area is again accessible, contributes to the safety of certain other furbearers. During winter in areas of heavy snowfall, the badger and skunk, as well as the bear, that occupy the same habitat as the coyote, are in hibernation or inactive.

Protected bait placement

Poison can usually be placed in such a manner as to be available only to the pest species; for example, the placing of pocket gopher baits in the closed underground burrows, meadow mouse surface bait spots carefully covered with mulch (haycocks), asphalt paper squares, or similar protection.

Less inclusive is the method of thinly scattering each grain bait spot as for ground squirrel control, which prevents deer, cattle, horses, and sheep from feeding thereon. Regulations of the Fish and Wildlife Service regarding the use of thallium and "1080" poison-studded stations in coyote control reads as follows: "To take advantage of the wide-ranging habits of the coyote, and to minimize the dangers to the less nomadic and smaller carnivorous furbearers, stations are to be held to the lowest possible number. The pattern of placement should be maintained as closely as possible to maximum of one per township, with such deviations as are necessary to take care of local conditions. In any event, the average placement on any given range used as the control unit shall not exceed one per township." Thus, with a spacing of one poison station to 36 square miles it is possible to intrude on only a small fraction of the home ranges of small carnivores. The instruction, however, continues: "Stations shall never be used in areas inhabited by fur animals, or in any area where beneficial wildlife would be endangered thereby. For this reason, stations shall not be placed in or close to timbered areas or near streams and other waters, except where such environments are positively known not to be inhabited by valuable fur animals....."

Discussion

In the handling of poisons for the control of injurious wildlife, it is not the use of any one of the above methods that provides safety and selectivity, but a combination of all that are applicable. For example, when the Fish and Wildlife Service substituted zinc phosphide for strychnine in the control of the ground squirrel in southeastern Idaho several years ago, the following safeguards resulted: (1) No farmer obtained it for use until he had attended an actual field demonstration in its proper handling and exposure. (2) Zinc phosphide has an almost negligible secondary hazard for predatory birds and mammals in the ratio recommended as applied to grain baits. (3) The black,

sooty color of the grain was unattractive to feeding birds. (4) Thinly scattered bait spots prevented feeding by deer and domestic livestock. (5) Zinc phosphide is slowly hydrolyzed by moisture into a harmless compound - thus, the residue left after the ground squirrels had completed feeding was soon impotent. (6) The amount of poison on the baits was carefully controlled by central supervised mixing. (7) Only one application a season was made, thus limiting the period during which poison grain was exposed. (8) The use of gas was demonstrated for clean-up of surviving squirrels, which removed the hazard of continued use of poison grain. (9) Community-wide efforts were invoked to reduce the year-after-year necessity of large-scale poison operations.

Conscientious adherence to the principles and practices as outlined insures safety to beneficial and harmless forms of wildlife and at the same time efficiently checks the injurious species. It should be apparent that an indifferent or careless approach to such matters may result in ineffective control, and promote destruction of harmless or beneficial wildlife forms.